

PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION.

Means for the Interconversion of Side-valve and Overhead-valve Internal-combustion Engines.

We, R. A. LISTER & COMPANY LIMITED, a British Company, and ARTHUR FREEMAN SANDERS, a British Subject, both of Victoria Iron Works, Long 5 Street, Dursley, Gloucestershire, do hereby declare the nature of this invention to be as follows:—

This invention relates to side-valve internal-combustion engines, and it has 10 for one of its objects to provide means whereby, with a minimum of alteration, a side, valve engine can be converted to an overhead valve engine, whilst a further and more important object is to 15 provide a form of cylinder head which can be substituted for that of a spark-ignited side-valve engine to convert the latter into an overhead valve compression-ignition engine.

20 According to the invention, a cylinder head, for substitution for that of a side-valve engine, embodies a passageway which, when the head is in position, is aligned with the seating for the side 25 valve, and the head carries an overhead valve gear which can be actuated by a push rod substituted for the side valve. Preferably the guide for the latter is replaced by a tube which acts to screen the 30 push rod from the gases passing along the passageway.

In one arrangement according to the invention, in which a spark-ignited engine with two side-by-side valves is to 35 be converted into an overhead valve compression-ignition engine, the cylinder head is replaced by one having two passages each of which extends through approximately 180 degrees from one of 40 the seatings for the side valves to the face of the cylinder head adjacent the cylinder barrel. At their latter extremities the passages are formed to provide valve seatings in known manner, and 45 posed in the head are overhead valves adapted to engage these seatings. Rockers for the overhead valves are pivotally mounted so that their ends lie over the respective side valve seatings.

The side valves which are no longer 50 required are replaced by push rods, the lower ends of which can engage the same cams or tappets as those through which the side valves were actuated, whilst the upper ends engage the rockers. An 55 adjustment of a known form may be provided at one end of each rocker to allow of varying the clearances.

If either push rod is of the same cross-section as the stem of the side valve it 60 replaces, the guide for the latter will serve as a guide for the push rod and a second guide can then be arranged higher up where the push rod enters the rocker chamber. Alternatively, these two guides 65 may be replaced by a tubular member secured at its ends and arranged to screen the push rod from the gases in the passage, this latter arrangement being 70 preferred.

It will be understood that the cylinder head contains, or provides with the cylinder barrel, the desired clearance 75 volume for the operation of the engine by compression ignition, and it preferably also carries the fuel-injection means and an igniter or other starting device. The timing of the overhead valves will be the same as that of the side valves of the 80 engine before conversion. If desired, however, use may be made of a different camshaft. Moreover, by using rockers of different ratios the travel of the overhead valves relative to that of the side valves can be varied as required. 85

Thus, by means of the invention, a side valve spark-ignited engine can be very easily converted into an overhead valve compression-ignition engine.

Dated this 25th day of August, 1931.

WALFORD & HARDMAN BROWN,
Chartered Patent Agents,
18 & 19, Hertford Street, Coventry,
Warwickshire.

COMPLETE SPECIFICATION.

Means for the Interconversion of Side-valve and Overhead-valve Internal-combustion Engines.

We, R. A. LISTER & COMPANY LIMITED, (only one appears in the drawing) each of which extends through approximately 60
a British Company, and ARTHUR FREEMAN SANDERS, a British Subject, 180 degrees from one of the seatings 3 for the side valves to the face of the cylinder head adjacent the cylinder barrel. At their latter extremities the passages are formed to provide valve seatings 4 in 65
both of Victoria Iron Works, Long Street, Dursley, Gloucestershire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to internal-combustion engines, of the kind which can be converted from a side-valve type of engine to an overhead-valve type by the 15 substitution, for the cylinder head, of one having a passage-way, aligned with the seating for the side-valve, and carrying an overhead-valve gear which can be actuated by a push-rod substituted for the 20 side-valve.

Obviously, also, the invention relates to the manufacture of such engines, as opposed to their mere conversion, where both the above-mentioned types are 25 arranged to have the same crankshafts, crankcases and cylinder blocks, etc., the two different types being produced by means of the different cylinder heads which can be selectively associated with 30 the same cylinder block and base.

The main object of the present invention is to reduce manufacturing costs, as regards side-valve and overhead-valve engines, by manufacturing according to 35 the above principle, and also to ensure that the running of these engines, when adapted for overhead-valve operation, will be satisfactory. A further object is to provide an improved overhead-valve compression ignition engine operating with 40 fuel injection.

According to the invention, when an engine of the above type is adapted for overhead-valve operation, a sleeve, 45 adapted to fit into, or to replace, the side-valve guide, acts entirely to screen the push-rod from the gases passing along the passage-way.

The accompanying drawing is a fragmentary sectional elevation showing one form of engine according to the invention.

In the construction illustrated, in which a spark-ignited engine with two 55 side-by-side valves has been converted into an overhead-valve compression-ignition engine, the cylinder head has been replaced by one having two passages 2

(only one appears in the drawing) each of which extends through approximately 60
180 degrees from one of the seatings 3 for the side valves to the face of the cylinder head adjacent the cylinder barrel. At their latter extremities the passages are formed to provide valve seatings 4 in 65
known manner, and disposed in the head are overhead valves 5 adapted to engage these seatings. Rockers 6 for the overhead valves are pivotally mounted at 7 so that their other ends lie over the respective side valve seatings 3.

The side valves (not shown) which are no longer required are replaced by push-rods 8, the lower ends of which can engage the same cams or tappets 9 as those 75
through which the side valves were actuated, whilst the upper ends engage the rockers. An adjustment of a known form may be provided at one end of each rocker to allow of varying the clearances. 80
Fitted into the cylinder block in place of the side-valve guide and secured to the cylinder head at its upper end is a tubular member or sleeve 10 arranged to screen the push-rod from the gases in the valve 85
passage. The push-rod is shown socketed at both ends so that no additional guide is necessary.

It will be understood that the cylinder head contains, or provides with the 90
cylinder barrel, the desired clearance volume for the operation of the engine by compression ignition, and it preferably also carries the fuel-injection means, indicated at 11, and an igniter or other starting device, such as a valve 12 for reducing the clearance volume. The timing of the overhead valves will be the same as that of the side valves of the engine before conversion. If desired, however, use may 100
be made of a different camshaft. Moreover, by using rockers of different ratios the travel of the overhead valves relative to that of the side valves can be varied as required. 105

The drawing also shows a clearance volume of known form comprising spaced interconnected chambers 13, 13 one of which is in communication with the cylinder bore by a tangential passage 14. 110

Thus, by means of the invention, a side-valve spark-ignited engine can be very easily converted into an overhead-valve compression-ignition engine.

Having now particularly described and 115
ascertained the nature of our said inven-

tion and in what manner the same is to be performed, we declare that what we claim is:—

1. In the manufacture or use of
5 internal-combustion engines, the combination with a side-valve form of cylinder block (which can be fitted with a cylinder head to operate as a side-valve engine), of a cylinder head embodying a
10 passage-way, which, when the head is in position, is aligned with the seating for the side valve, and carrying overhead valve gear operable by a push-rod mounted to extend into the place where
15 the side valve would be, and a sleeve adapted to fit into, or replace, the side-valve guide and acting entirely to screen the push-rod from the gases passing along the passage-way.
- 20 2. An overhead-valve compression-ignition engine having a cylinder block of side-valve form and a cylinder head pro-

viding the clearance volume in the form of two spaced interconnected cavities one of which communicates with the cylinder
25 bore by a tangential passage, the head having a valve passage aligned with the seating in the cylinder block for the side valve and having overhead rocker gear operable by a push-rod disposed where the
30 side valve would be and screened from gases in the valve passage by a sleeve fitting into the cylinder head and cylinder block.

3. An overhead-valve compression-ignition engine, with a side-valve form of cylinder block, arranged substantially as
35 hereinbefore described with reference to the drawing hereof.

Dated this 24th day of May, 1932.

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[This Drawing is a reproduction of the Original on a reduced scale.]

